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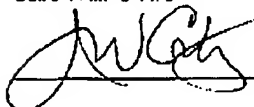
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1 page; Form PO/SB/08A; Form PTO/SB/8B and copy of GB 2 326 269 A)  
with regard to Serial No. 10/716,117 is being facsimiled to the United States  
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June 30, 2009

James V. Costigan  
Registration No. 25,669

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JUN 30 2009

Docket No. 645-165

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:

YASUSHI INDA.

Examiner: ALIX E. ECHELMEYER

Serial Number: 10/716,117

Art Unit: 1745

Filed: November 18, 2003

Title: **LITHIUM ION SECONDARY BATTERY AND A METHOD FOR  
MANUFACTURING THE SAME**

New York, NY 10036  
June 30, 2009

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA

INFORMATION DISCLOSURE STATEMENT

This Information Disclosure Statement is being filed under the provisions of 37  
CFR§1.97.

Office Action Canadian Patent Office  
(dated April 18, 2007)


Lists references cited by Canadian Examiner

GB2 326 269 A

Cited by Canadian Examiner

Authorization is given to charge Deposit Account No. 08-1540 for the required fee for  
consideration of the Information Disclosure Statement.

Respectfully submitted,

  
James V. Costigan  
Registration No.: 25,669

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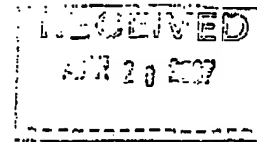
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April 18, 2007

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Application No. : **2,451,181**  
Owner : **KABUSHIKI KAISHA OHARA**  
Title : **LITHIUM ION SECONDARY BATTERY AND METHOD FOR  
MANUFACTURING THE SAME**  
Classification : **H01M 10/36 (2006.01)**  
Your File No. : **368-149**  
Examiner : **Philip Gbor**

**YOU ARE HEREBY NOTIFIED OF :**

- A REQUISITION BY THE EXAMINER IN ACCORDANCE WITH SUBSECTION 30(2) OF THE *PATENT RULES*;
- A REQUISITION BY THE EXAMINER IN ACCORDANCE WITH SECTION 29 OF THE *PATENT RULES*.

IN ORDER TO AVOID MULTIPLE ABANDONMENTS UNDER PARAGRAPH 73(1)(A) OF THE *PATENT ACT*, A WRITTEN REPLY TO EACH REQUISITION MUST BE RECEIVED WITHIN 6 MONTHS AFTER THE ABOVE DATE.

This application has been examined taking into account applicant's correspondence received in this office on February 27, 2004.

The number of claims in this application is 20.

The search of the prior art has revealed the following:

References Applied:

European Patent Office Applications

D1: EP 1 052 718 A1 □ November 15, 2000  
D2: EP 0 704 920 A1 □ April 3, 1996

Sumito Electric Industries, Ltd.  
MATSUSHITA ELECTRIC INDUSTRIAL  
CO., LTD.

United States Patent

D3: US 6,315,881 B1 □ November 13, 2001


Fu

United Kingdom Application

D4: GB 2 326 269 A December 16, 1998

Samsung Display Devices Co. Ltd.

Canada

OPIC  CIPC

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D5: Kennedy et al. "Preparation and Electrochemical properties of the  $\text{SiS}_2\text{-P}_2\text{S}_5\text{-Li}_2\text{S}$  Glass Coformer System", Journal of the Electrochemical Society, Volume 136, Number 9, Pages 2441-2443, September 1989.  $\alpha$

$\alpha$  citation stemming from a foreign search report

D1 discloses a lithium secondary battery having a positive electrode, a negative electrode and a solid electrolyte. The solid electrolyte comprises lithium ion conductive inorganic substances (page 3, paragraph 0014). The thickness of the electrolytic layer is between 50 nm and 50  $\mu\text{m}$ , thus the solid electrolyte is a "thin" film (page 5, paragraph 0029). In example 1-1, the solid electrolyte contains 100% inorganic substances. The solid electrolyte is first coated on the negative electrode active material before the coupling of the negative electrode (on which the solid electrolyte is formed) and positive electrode to form a battery (page 9, paragraphs 0054-0056). The conductivity of the solid electrolyte is  $10^{-3}$  S/cm or more at 25 °C (page 4, paragraph 0021). The electrolytic layer is amorphous (thus glassy) (page 4, paragraph 0017). A disclosed powder of the lithium ion conducting substances has particle size between 0.1 to 0.5  $\mu\text{m}$  and the positive electrode comprises the lithium ion conducting substances (page 9, paragraph 0060).

D2 discloses a lithium secondary battery having a positive electrode, a negative electrode and a solid electrolyte. The solid electrolyte comprises a lithium ion conductive inorganic substance. The particle size of a powdered lithium ion conductive substance is 100 mesh (about 150  $\mu\text{m}$ ) or smaller (page 3, lines 47-48). The electrodes of the battery comprise the solid electrolyte material (page 3, lines 26-29).

D3 discloses a lithium battery having a positive electrode, a negative electrode and a solid electrolyte. The solid electrolyte is a thin film and comprises lithium ion conductive glass-ceramic. Crystal phase of the conductive crystal  $\text{Li}_{1-x-y}\text{Al}_x\text{Ti}_2\text{Si}_y\text{P}_{3-y}\text{O}_{12}$  is made to grow from the glass by heat treatment. The conductivity of the solid electrolyte is not less than  $10^{-3}$  S/cm at room temperature (column 2, lines 34- 67). The thickness of the solid electrolyte layer is less than 1 mm (column 11, lines 64-66). The positive and negative electrodes, and the collectors of the cell are formed sequentially by any of known methods such as ion sputtering, CVD, screen printing, coating, sol-gel method, ion plating, ion beam evaporation and electron beam evaporation (column 12, lines 4-13).

D4 discloses a solid electrolyte and the preparation method thereof for lithium batteries. The battery comprises an anode, a cathode and the solid electrolyte. The solid electrolyte comprises at least one lithium compound and at least one compound selected from  $\text{B}_2\text{O}_3$ ,  $\text{P}_2\text{S}_5$ ,  $\text{SiS}_2$  or  $\text{GeS}_2$ . The electrolyte is glassy (thus amorphous) (page 3, lines 3-9) and conducts lithium ions. The conductivity of the electrolyte in an example is  $4.5 \times 10^{-3}$  S/cm at room temperature (page 11, line 6). The glass electrolyte is used in the powdered form (page 5, lines 8-9). The glass electrolyte is mixed with a polymer to form glass-polymer composite electrolyte. A lithium salt is also added to the glass-polymer composite electrolyte (page 4, lines 5-18). The volume ratio of the glass electrolyte:polymer electrolyte in the glass-polymer composite electrolyte is in the range of 75:25 to 93:7 (page 4, lines 19-20). The electrodes of the battery comprise the glass-polymer composite electrolyte (page 10, lines 9-14).

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D5 discloses glass electrolytes for use in solid-state batteries. The maximum conductivity obtained for the electrolytes is 0.7mS/cm (abstract).

**The examiner has identified the following defects in the application:**

Claims 1-5, 7, 9, 11 and 14-18 do not comply with paragraph 28.2(1)(b) of the *Patent Act*. D1 disclosed the claimed subject matter before the claim dates.

Claims 1, 3, 5, 7, 9, 11 and 14-17 do not comply with paragraph 28.2(1)(b) of the *Patent Act*. D2 disclosed the claimed subject matter before the claim dates.

Claims 1-8, 8, 14 and 15 do not comply with paragraph 28.2(1)(a) of the *Patent Act*. The subject-matter defined by these claims was disclosed by D3 more than one year before the filing date of the present patent application.

Claims 1, 3-5, 7, 9, 12 and 14-16 do not comply with paragraph 28.2(1)(b) of the *Patent Act*. D4 disclosed the claimed subject matter before the claim dates.

Claims 1, 3-4, 7, 14 and 15 do not comply with paragraph 28.2(1)(b) of the *Patent Act*. D5 disclosed the claimed subject matter before the claim dates.

D1 does not teach the subject matter of claim 15. D2, D3, D4 and D5 do not teach the subject matter of claims 3, 14 and 15. Claims 3, 14 and 15 define the product in terms of a process used to prepare said product (product-by-process claims). A product-by-process claim is allowable only if a product is clearly distinguished from the prior art products. Since the product of claim 1 is not new (disclosed by either one of D1 to D5), claims 3, 14 and 15 are not allowable in view of paragraphs 28.2(1)(b) and 28.2(1)(a) of the *Patent Act*.

Claims 1, 9 and 10 do not comply with section 28.3 of the *Patent Act*. The subject matter of these claims would have been obvious on the claim date to a person skilled in the art or science to which they pertain having regard to any one of D1, D2 and D4 in view of D3. The subject matter of claims 1 and 9 is disclosed by each one of D1, D2 and D4. D1, D2 and D4 do not disclose a "lithium ion conductive glass-ceramic" (specified in claim 10 and disclosed by D3). Since the lithium ion conductive inorganic substance disclosed by D1, D2 and D4, and the "lithium ion conductive glass-ceramic" disclosed by D3 are both used as solid electrolytes, it will not require inventive ingenuity on the part of a person skilled in the art to replace the powdered form of the lithium ion conductive inorganic substance disclosed by D1, D2 or D4 with a powdered form of the lithium ion conductive glass-ceramic disclosed by D3. Thus, the subject matter of claim 10 does not appear to be inventive.

Claims 1, 9 and 13 do not comply with section 28.3 of the *Patent Act*. The subject matter of these claims would have been obvious on the claim date to a person skilled in the art or science to which they pertain having regard to D4 in view of D3. The subject matter of claims 1 and 9 is disclosed by D4. D4 also discloses a glass-polymer composite electrolyte comprising a "glass electrolyte" (a lithium ion conductive inorganic substance) and a polymer. D4 does not disclose a "lithium ion conductive glass-ceramic". Since the lithium ion conductive inorganic substance disclosed by D4 and the "lithium ion conductive glass-ceramic" disclosed by D3 are both used

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as solid electrolytes, it will not require inventive ingenuity on the part of a person skilled in the art to replace the "lithium ion conductive inorganic substance" disclosed by D4 with the "lithium ion conductive glass-ceramic" disclosed by D3. Thus, the subject matter of claim 13 does not appear to be inventive.

Claims 18 and 19 do not comply with section 28.3 of the *Patent Act*. The subject matter of these claims would have been obvious on the claim date to a person skilled in the art or science to which they pertain having regard to D1 and state of the art. The subject matter of claim 18 is disclosed by D1. The subject matter of claim 19 does not appear to be inventive since it is a common practice in the art to form an electrolyte layer on an electrode by coating the electrode with a slurry comprising the solid electrolyte.

Claims 18 and 20 do not comply with section 28.3 of the *Patent Act*. The subject matter of these claims would have been obvious on the claim date to a person skilled in the art or science to which they pertain having regard to D1 in view of D3. The subject matter of claim 18 is disclosed by D1. The subject matter of claim 20 does not appear to be inventive since D3 teaches that heating glass (amorphous material) leads to the formation of crystal phases.

Claims 1 and 18 do not comply with section 84 of the *Patent Rules* because they are not fully supported by the teaching of the present description. The claims define a solid electrolyte containing a lithium ion conductive inorganic substance. The claims are directed to an extremely large number of possible compounds (any lithium ion conductive inorganic substance), however, only  $\text{Li}_{1-x-y}\text{Al}_x\text{Ti}_{2-x}\text{Si}_y\text{P}_{3-y}\text{O}_{12}$  is disclosed in the examples. In view of the above, the applicant should limit the scope of the claims to subject matter which can be soundly predicted in view of the original description. Guidance as to what constitutes a sound prediction is provided by the principles set out in *Apotex v. Wellcome* [(2002), 21 C.P.R. (4<sup>th</sup>), 499], namely that there must be: 1) a factual basis, 2) an articulable line of reasoning, and 3) proper disclosure.

Claims 1-5, 12-15 and 18-20 are indefinite and do not comply with subsection 27(4) of the *Patent Act*. The term "thin" renders the claims indefinite because this term is subjective and open to interpretation.

Claims 3 and 14-20 are indefinite and do not comply with subsection 27(4) of the *Patent Act*. The inclusion of "and/or" causes ambiguity.

Claims 12 and 14-16 are indefinite and do not comply with subsection 27(4) of the *Patent Act*. The second introduction (use of an indefinite article) of an element already introduced causes ambiguity. The terms:

- "a lithium ion conductive substance" (claim 12);
- "an electrode material" (claims 14 and 15);
- "a positive electrode" (lines 1-2 of claim 16);
- "a negative electrode" (line 2 of claim 16); and
- "a solid electrolyte" (claim 16)

have been defined previously in the claims. The aforementioned terms should therefore be referred to using a definite article.

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The term "negative electrode collector 4" (page 12, line 12; and page 14, line 1) appears to be a typographical error. It is recommended to the applicant to change it to "negative electrode collector 5".

The applicant is requested to submit a replacement page compliant with subsection 68(1) and section 82 of the *Patent Rules*. Page 1/1 of the drawings is illegible. The texts in Fig. 1 to Fig. 3 are not clear.

In view of the foregoing defects, the applicant is requisitioned, under subsection 30(2) of the *Patent Rules*, to amend the application in order to comply with the *Patent Act* and the *Patent Rules* or to provide arguments as to why the application does comply.

**Section 29 of the Patent Rules requisition**

Under section 29 of the *Patent Rules*, the applicant is requisitioned to provide:

- an identification of any prior art cited by the United States Patent and Trademark Office and Japanese Patent Office in respect of the applications describing the same invention on behalf of the applicant or on behalf of any other person claiming under an inventor named in the present application, and the patent numbers, if granted, under paragraphs 29(1)(a) and 29(1)(b) of the *Patent Rules*; and
- particulars of conflict, opposition, re-examination or similar proceedings, affecting these applications, under paragraph 29(1)(c) of the *Patent Rules*.

To satisfy this requisition, applicant should provide all the preceding information or documents, or provide in accordance with subsection 29(3) of the *Patent Rules* a statement of reasons why any information or document is not available or known.

Philip Gbor  
Patent Examiner  
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